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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,296	04/08/2004	Michael N. Perugini	02021-072003	7445

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EXAMINER	
ZARROLI, MICHAEL C	

ART UNIT	PAPER NUMBER
2839	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/820,296	PERUGINI ET AL.	
	Examiner	Art Unit	
	Michael C. Zarroli	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *59-89* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *59,60,62,63,66-69,76 and 78-89* is/are rejected.

7)☒ Claim(s) *61,64,65,70-75 and 77* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *definitions*.

DETAILED ACTION

Double Patenting

1. Claim 88 objected to under 37 CFR 1.75 as being a substantial duplicate of claim 87. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 84 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 39 of copending Application No. 10/786248. Although the conflicting claims are not

identical, they are not patentably distinct from each other because the subject matter of claim 84 is encompassed by claim 39.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Objections

4. Claim 62 objected to because of the following informalities: There is an antecedent problem with "reference ground circuit." The examiner is certain the applicant is referring to ground circuit in claim 59, line 2. Appropriate correction is required.

5. Claim 79 objected to because of the following informalities: There is an antecedent problem with "the shield." The examiner is certain the applicant is referring to "an electrically conductive member" in line 8. Also in this claim there is an antecedent problem with "the circuit card" in the preamble. Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 76, 78 and, 85-89 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Borkar et al.

Borkar discloses an intercoupling component (title) for receiving an array of contacts within a digital or analog transmission system having an electrical ground circuit (pin 612) and a chassis ground circuit, the intercoupling component comprising: an array of electrically conductive contacts (e.g. 606) disposed in a substrate (604) formed of electrically insulative material (col. 7 lines 52-58); and an electrically conductive frame (e.g. 710, 750 or 900) disposed around the array of electrically conductive contacts (fig. 7B), wherein the frame is configured to electrically connect with the chassis ground circuit (claim 7).

Regarding claim 78 Borkar discloses that the array of contacts are configured to transmit differential signals (fig. 8 cptr sys).

8. Claim 84 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Borkar et al.

Borkar discloses a circuit card for use in a digital or analog transmission system having an electrical ground circuit (612) and a chassis ground circuit (710 or 750),

the circuit card comprising: a plurality of contact pads (mating with solder balls) arranged in a predetermined footprint; and an interconnection device comprising: an array of electrically conductive contacts (606) disposed in a substrate (602, 604) formed of non-conductive material; and an electrically conductive frame (710 or 750) disposed around the array of electrically conductive contacts, wherein the frame is configured to electrically connect with the chassis ground circuit (fig. 7B).

Claim Rejections - 35 USC § 103

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 59-60 and, 62-63 rejected under 35 U.S.C. 103(a) as being unpatentable over Wilheim in view of Bates et al.

Wilheim discloses an intercoupling component (title) for receiving an array of contacts within a digital or analog transmission system having a chassis ground circuit (claim 3), the intercoupling component comprising: a substrate (10) formed of electrically insulative material (fig. 2) and having an upper surface (fig. 1), the substrate including a plurality of holes (14) disposed on its upper surface and arranged in a predetermined footprint corresponding to the array of a contacts; and a plurality of electrically conductive signal contacts (30) configured to transmit a digital or analog communication signal, each signal contact disposed within a hole on the upper surface of the substrate (fig. 2) forming an array of signal contacts, wherein some or all of the electrically conductive signal contacts are surrounded by an electrically conductive member (34) configured to electrically connect to the chassis ground circuit (claim 3).

Wilheim does not specifically state that there is an electrical ground circuit.

Bates discloses an electrical ground circuit (42, 46) in an intercoupling component.

At the time the invention was made it would have been obvious to one of ordinary skill in the art to include an electrical ground circuit in the device of Wilheim as taught by Bates et al. The motivation for this would be to eliminate any stray noise at the point where the contacts 30 leave the chasis; figure 2. A grounding circuit is almost mandatory a given in any connectors with layers and contacts.

Regarding claim 60 Wilheim discloses that the electrically conductive member comprises a frame (34) formed around an outer perimeter of the substrate (fig. 2).

Regarding claim 62 Wilheim discloses that a plurality of electrically conductive reference contacts (30) each disposed within a hole (14) on the upper surface of the substrate, wherein the electrically conductive reference contacts are configured to electrically connect to the reference ground circuit of the system (see motivation for 103 above).

Regarding claim 63 Wilheim discloses that the substrate comprises a plurality of segments formed of electrically conductive material (20, 22, 26 etc.).

12. Claims 66-69 rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al in view of Borkar et al.

Ward discloses an intercoupling component (title) for receiving an array of contacts within a digital or analog transmission system having a chassis ground

circuit (20 or 50), the intercoupling component comprising: an array of electrically conductive contacts (14) disposed in a substrate (12 and/or 32) formed of electrically insulative material; and an electrically conductive shield (e.g. 42) at least partially disposed within the array of electrically conductive contacts (fig. 1), wherein the shield is configured to electrically connect with the chassis pound circuit (fig. 3).

Ward does not specifically state that there is an electrical ground circuit.

Borkar discloses an electrical ground circuit (612) in an intercoupling component.

At the time the invention was made it would have been obvious to one of ordinary skill in the art to include an electrical ground circuit in the device of Ward as taught by Borkar et al. The motivation for this would be to eliminate any stray noise at the point where the contacts 14 leave the chassis. A grounding circuit is almost mandatory a given in any connectors with layers and contacts.

Regarding claim 67 Ward discloses that the shield surrounds a portion of the contacts with the array of contacts (42 in fig. 1).

Regarding claims 68-69 Ward discloses that a frame (2) is disposed around the array of contacts and configured to electrically connect with the chassis ground circuit and shield (fig. 1).

13. Claims 79-83 rejected under 35 U.S.C. 103(a) as being unpatentable over Ward et al in view of Borkar et al.

Ward discloses an apparatus for use in a digital or analog transmission system having a chassis ground circuit, the apparatus comprising; a printed circuit board (32), and an interconnection device coupled to the printed circuit board (fig. 1), the interconnection device comprising: an array of electrically conductive contacts (14) disposed in a substrate (12) formed of nonconductive material; and an electrically conductive member (42) at least partially disposed within the array of electrically conductive contacts (fig. 1), wherein the electrically conductive member is configured to electrically connect with the chassis ground circuit (figures 1 & 3).

Ward does not specifically state that there is an electrical ground circuit.

Borkar discloses an electrical ground circuit (612) in an intercoupling component.

At the time the invention was made it would have been obvious to one of ordinary skill in the art to include an electrical ground circuit in the device of Ward as taught by Borkar et al. The motivation for this would be to eliminate any stray noise at the point where the contacts 14 leave the chassis. A grounding circuit is almost mandatory a given in any connectors with layers and contacts.

Regarding claim s 80-83 Ward discloses that the electrically conductive member comprises a shield formed of electrically conductive material col. 3 lines 15-17). This electrically conductive member surrounds a portion of the contacts within the array of contacts (fig. 1). A frame (2) disposed around the array of contacts and configured to electrically connect with the chassis ground circuit (fig. 1). This frame is electrically connected to the shield (also fig. 1).

Allowable Subject Matter

14. Claims 61, 64-65, 70-75 and, 77 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter: Any of the dependent claims with just one limitation the examiner will not give reasons for; note that for claims 64-65 and, 71-72 the examiner has attached definitions from an electronics dictionary defining how the examiner interprets the allowable matter in these claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Zarroli whose telephone number is 571-272-2101. The examiner can normally be reached on 7:30 to 3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, T.C. Patel can be reached on (571) 272-2800 ext 39. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael C. Zarroli
Primary Examiner
Art Unit 2839

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mance because the self-oscillating
roached. 3. The singing point of a
ack to itself is the point at which
nt to make the circuit break into

effect—Reception and repro-
modulation by ordinary pieces of
of stovepipe, in contact with each
chanically poor connections, such
welds, that act as nonlinear diodes
lation distortion when subjected to
ear transmitters.

de—An instruction that contains
ata as well as the operation or
to be performed on this data.
—With reference to vibratory con-
cement of an oscillating structure
an position.
k—*See* single-anode tube.
e—Also called a single-anode
with one anode (used chiefly for

t language—A programming
nly one value to be assigned to
xpression.
—A type of gyro in which the
ted in a gimbal arranged so as to
relative to the stable element.
nicrocomputer—Also called
uter. A single printed circuit board
mum, processor, memory (ROM
put/output—usually a combina-
rallel ports. May also include a
and bus interconnection scheme.
omputer family may also include
n elements (such as memory and
it boards of the same format as the

rbon microphone—A micro
-filled buttonlike container on one
hragm. As the sound waves move
istance of the carbon changes, and
nt constitutes the desired audio

M recording—The method of
input signal is frequency modu
the carrier is recorded on a single
without bias.
-A carrier-only or single-tone mod
ransmitter and matching receiver

ionopulse tracking system—
g.
implex—Nonsimultaneous com
stations over the same frequency

telegraph circuit capable of non
communication.
ystem—An alarm circuit th
of the circuit through each senso
rough either ground or a separ

n receiver—A receiver emplo
circuit in which the input signa

A piece of material in which
tation of all the basic groups

f-freedom system—A syst
oordinate is required to define
/stem.

single-dial control—Control of a number of different devices or circuits by means of a single adjustment (e.g., in tuning all variable-capacitor sections of a radio receiver).

single-ended—Unbalanced, such as grounding one side of a circuit or transmission line.

single-ended amplifier—An amplifier in which only one tube or transistor normally is employed in each stage—or if more than one is used, they are connected in parallel so that operation is asymmetric with respect to ground.

single-ended input—Amplifier input configuration in which all analog inputs are referenced to system ground.

single-ended input impedance—The impedance between one amplifier input terminal and ground (with the other input terminal, if any, grounded for ac) when the amplifier is balanced.

single-ended input voltage—The signal voltage applied to one amplifier input terminal with the other input terminal at signal ground.

single-ended output voltage—The signal voltage between one amplifier output terminal and ground.

single-ended push-pull amplifier circuit—An amplifier circuit having two transmission paths designed to operate in a complementary manner and connected to provide a single unbalanced output. (No transformer is used.)

single-ended signal—As opposed to a difference-mode signal, a signal that is at ground potential when it is at zero level.

single-ended tube—A metal tube in which all electrodes—including the control grid—are connected to base pins and there is no top connection. The letter S after the first numerals in a receiving-tube designation (e.g., 6SN7) indicates a single-ended tube.

single-ended voltage gain—Within the linear range of an amplifier, the ratio of a change in output voltage to the corresponding change in single-ended input voltage.

single-frequency duplex—A method that provides communications in opposite direction over a single-frequency carrier channel, but not at the same time. The change between transmitting and receiving conditions is controlled automatically by the voices of the communicating parties.

single-frequency simplex—A system of single-frequency carrier communications in which the change from transmission to reception is accomplished by manual rather than automatic means.

single-grip terminal—A solderless terminal designed to permit a crimp to the wire only.

single-groove stereo—*See* monogroove stereo.

single-gun color tube—A color picture tube with a single electron gun that produces only one beam, which is sequentially deflected across the phosphor dots.

single harmonic distortion—The ratio of the power at the fundamental frequency measured at the output of the transmission system considered to the power of any single harmonic observed at the output of the system because of its nonlinearity, when a single-frequency signal of specified power is applied to the input of the system. It is expressed in decibels.

single-hop propagation—Transmission in which radio waves are reflected only once in the ionosphere.

single in-line package—*See* SIP.

single-junction photosensitive semiconductor—Two layers of semiconductor materials with an electrode connection to each material. Light energy controls the amount of current.

single-line diagram—Also called single-line drawing. A form of schematic diagram in which single lines are used to show component interconnections even though two or more conductors are required in the actual circuit.

single-line telephone—A telephone that provides access to one telephone line.

single-loop feedback—A loop in which feedback may occur only through one electrical path.

single-mode fiber—1. A fiber waveguide that supports only one mode of propagation. 2. An optical glass fiber that consists of a step core of very small diameter, approximately 6 μm, and a cladding approximately 20 times the thickness of the core. Tremendous information rates (great bandwidth) are possible with single-mode fibers. The primary disadvantages of this type of fiber are cost of manufacture, difficulty in launching signals into the fiber, and difficulty in splicing and general handling in the field.

single-operand instruction—An instruction containing a reference to one register, memory location, or device.

single-phase circuit—Either an alternating-current circuit with only two points of entry, or one with more than two points of entry but energized in such a way that the potential differences between all pairs of points of entry are either in phase or 180° out of phase. A single-phase circuit with only two points of entry is called a single-phase two-wire circuit.

single-phase synchronous generator—A generator that produces a single alternating electromotive force at its terminals.

single phasing—The tendency of the rotor (of a motor tach generator) to continue to rotate when one winding is opened and the other winding remains excited.

single-point ground—*See* uniground.

single-point grounding—A grounding system that attempts to confine all return currents to a network that serves as the circuit reference. It does not imply that the grounding system is limited to one earth connection. To be effective, no appreciable current is allowed to flow in the circuit reference; i.e., the sum of the above return currents is zero.

single-polarity pulse—A pulse that departs from normal in one direction only.

single pole—A contact arrangement in which all contacts in the arrangement connect, in one position or another, to a common contact.

single-pole, double-throw—Abbreviated SPDT. A three-terminal switch or relay contact for connecting one terminal to either of two other terminals.

single-pole-piece magnetic head—A magnetic head with only one pole piece on one side of the recording medium.

single-pole, single-throw—Abbreviated SPST. 1. A two-terminal switch or relay contact that either opens or closes one circuit. 2. A switch with only one moving and one stationary contact. Available either normally open (no) or normally closed (nc).

single rail—The method of data transfer in a computer on only one line or wire. The device at the destination must be able to handle the data in either the high-level or low-level value. The return path is by way of common or ground.

single-rank binary—A flip-flop that requires no more than one full clock pulse from a single clock system to transfer the logic from a synchronous input to the output of the binary. It contains only one memory stage.

single sampling plan—The plan that consists of a single sample size with associated acceptance and rejection criteria.

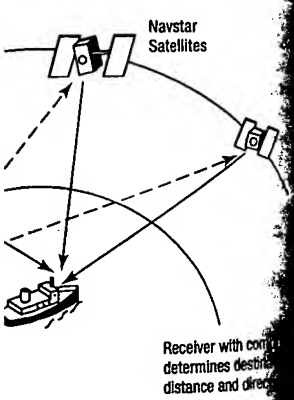
on—A generalization of the
ich the unknowns are not simply
of one or more independent
unknown function or functions
differential equation, but also the
-order derivatives with respect to
or variables.
–Speed-change errors that occur
frequencies, or phases across the
:.
1. The ratio of the differential
rential amplifier divided by the
causing that output. 2. Variation
mission system with changing

ontrol—Also called gain sensi
for altering the gain of a radio
ith an expected change of signal
ne amplitude differential betwee
r output.

ometer—A galvanometer hav
osed coils, so that their current
ther. A zero reading is obtaine
ual.
1. The difference between tw
which applies to an upswing
r to a downswing. 2. The spa
hing points. For example, a roo
ight switch the furnace on at 6
in a 4° differential. *See also* de

In an analog computer, a mech
ngles of rotation of three shaft
that the algebraic sum of the ro
qual to twice the rotation of
used for addition or subtracti

rator—A synchro differe
rvo system.
–A technique using the glob
PS) network, in which a fix
(for precisely known thre
locally) determines corrections
aft (or other mobile units) usi



l positioning system (GPS).

lance—The internal impeda
input terminals of an operati

differential input—1. An input circuit that rejects voltages that are the same at both input terminals and amplifies the voltage difference between the two input terminals. May be either balanced or floating and may also be guarded. 2. An input applied between two terminals of an operational amplifier, neither of which is at ground (earth) potential.

differential-input amplifier—An amplifier in which the output is ideally a function only of the difference between the signals applied to its two inputs, both signals being measured with respect to a common low or ground reference point.

differential-input capacitance—The capacitance between the inverting and noninverting input terminals.

differential-input impedance—1. The impedance between the inverting and noninverting input terminals of a differential amplifier. 2. The impedance measured between the positive and the negative input terminals of an operational amplifier.

differential-input measurement—Also called floating input. A measurement in which the two inputs of a differential amplifier are connected to two points in a circuit under test and the amplifier displays the difference voltage between the points. In this type of measurement, each input of the amplifier acts as a reference for the other, and ground connections are used only for safety reasons.

differential-input rating—The maximum differential input that may be applied between the two terminals of an operational amplifier.

differential-input resistance—The resistance between the inverting and noninverting input terminals of a differential amplifier. *See* input resistance.

differential-input voltage—The maximum voltage that can be applied across the input terminals of a differential amplifier without damaging the amplifier.

differential-input voltage range—The range of voltages that may be applied between input terminals without forcing the circuit to operate outside its specifications.

differential-input voltage rating—The maximum allowable signal that may be applied between the inverting and noninverting inputs of a differential amplifier without damaging the amplifier.

differential instrument—A galvanometer or other measuring instrument having two circuits or coils, usually identical, through which currents flow in opposite directions. The difference, or differential effect, of these currents actuates the indicating pointer.

differential keying—A method of obtaining chirp-free break-in keying of a cw transmitter by turning the oscillator on quickly before the keyed amplifier stage can pass any signal, and turning it off quickly after the keyed amplifier stage has cut off.

differential linearity—The measure of linearity between digital states in a/d and d/a converters. If the differential linearity is specified as $\pm 1/2$ lsb, the step size from one state to the next may range from $1/2$ to $3/2$ of an lsb step.

differential microphone—*See* double-button carbon microphone.

differential-mode gain—Abbreviated DMG. The ratio of the output voltage of a differential amplifier to the differential-mode input voltage. 2. The voltage gain exhibited by an operational amplifier in response to differential-mode signals.

differential-mode input—The voltage difference between the two inputs of a differential amplifier.

differential-mode signal—1. A signal that is applied between the two ungrounded terminals of a balanced three-terminal system. 2. In an amplifier with a differential input, a signal that appears at inverting and noninverting inputs with opposite phase but identical frequency and amplitude. It is not necessarily referred to ground.

differential modulation—A type of modulation in which the choice of the significant condition for any signal element is dependent on the choice for the previous signal element.

differential nonlinearity—The difference between actual analog voltage change and the ideal (1 lsb) voltage change at any code change of a digital-to-analog converter.

differential output voltage—The difference between the values of the two ac voltages that are present in phase opposition at the output terminals of an amplifier when a differential voltage is applied to the input terminals of the amplifier.

differential pair—A pair of transistors sharing a common emitter circuit but with two independent base inputs.

differential permeability—1. The ratio of the positive increase of normal induction to the positive increase of magnetizing force when these increases are minute. 2. The slope of the normal induction curve.

differential phase—1. The difference in phase shift through a television system for a small, high-frequency sine-wave signal at two stated levels of a low-frequency signal on which the first signal is superimposed. 2. In a color TV signal, the phase change of the color subcarrier introduced by the overall circuit, measured in degrees as the picture signal on which it rides is varied from blanking to white level.

differential phase-shift keying—Abbreviated DPSK. A modulation scheme in which the information is conveyed by changes in carrier phase during one interval relative to the preceding interval.

differential pressure transducer—A pressure transducer that accepts simultaneously two independent pressure sources, and the output of which is proportional to the pressure difference between the sources.

differential protective relay—A protective device that functions on a percentage of phase angle or other quantitative difference of two currents or of some other electrical quantities.

differential relay—A relay with multiple windings that functions when the voltage, current, or power difference between the windings reaches a predetermined value. The power difference may result from the algebraic addition of the multiple inputs.

differential resistance—The resistance measured between the terminals of a diode under small-signal and specified bias conditions.

differential resolver—A servo unit with a two-phase stator and a three-phase rotor that is used as a transolver, with the advantage that when connected as a control transformer, the signal does not travel through slip rings.

differential selsyn—A selsyn in which both the rotor and the stator have similar windings that are spread 120° apart. The position of the rotor corresponds to the algebraic sum of the fields produced by the stator and rotor.

differential stage—A symmetrical amplifier stage in which two inputs are balanced against each other so that when there is no input signal, or equal input signals, there is no output signal. An input-signal unbalance, including a signal to only one input, produces an output signal proportional to the difference between the input signals.

differential synchro—*See* synchro differential generator; synchro differential motor.